Platelets – an important element of the immune system

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Abstract

Platelets are anucleate cells derived from the megakaryocyte series, and have long been considered only as cells responsible for coagulation and the fibrinolysis process. However, recently more data shows that they are also effector cells in the inflammatory response and important elements of the immunological response. Platelets store and release many biologically active substances, including growth factors, cytokines and chemokines (tab. 1), which actively affect i.a. elements of the immune system, and thus become regulators of immunity and mediators of inflammatory response. Their impact on the immune system cells is also associated with the induction of leucocytes and progenitor cells to the site of pathogen permeation or vascular injury inflow, as well as endothelial cells. Interacting with neutrophils, monocytes and lymphocytes, they not only activate them, but also form platelet-leukocyte aggregates that immobilise pathogens and prevent their spreading. Furthermore, platelets are capable of absorbing pathogens, affecting anti-infection immunity of the system. It is also assumed that the presence of receptors on their surface, such as Toll-like receptors (TLRs), affects their initiation and activity of the immunological response.

Key words: platelets, substances of platelets, receptors of platelets, immune system

Characteristics of platelets

Platelets are anucleate cells derived from the megakaryocyte series, characterised by high morphological variation. Under resting conditions platelets are oval, without cell processes and surrounded with shapeless glycocalyx which prevents their sticking and adhesion e.g. to the endothelium (Stosik and Deptula 1998, Smorag and Baj 2008). Their membrane is connected to an intercellular open canalicular system (OCS) which is necessary for their granule content exocytosis which takes part not only in coagulation and homeostasis, but also in inflammation and also activates the immune system (Elzey et al. 2003, Weyrich and Zimmermann 2004, Nurden 2011, Semple et al. 2011, Vieira-de-Abreu et al. 2012). The function of platelets during the immunological response is strictly connected with activation of their surface receptors, including the aforementioned TLR markers and the Fc receptor which recognises immunoglobulins G, E and A as well as selectin P and receptor CD40 (Boeler and Watala 2000,